Operator’s Manual

Contact Details:

McPhee Mixers,
58 John Street,
Blantyre,
Glasgow,
G72 0JF

Tel: (01698) 823422
Fax: (01698) 823853

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Text highlights:

WARNING: Text set off in this manner indicates that failure to follow directions could result in bodily harm or loss of life.

CAUTION: Text set off in this manner indicates that failure to follow directions could result in damage to equipment or loss of information.

Operator’s Manual
McPhee Mixer Unit
First Edition (2008)

General - Ref No. V01.0/031005

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1.

Knowing your Mixer Unit

Congratulations on your selection of a McPhee Mixer Unit.

We are confident that our specialised manufacturing facilities, extensive testing procedures and established track record will ensure that your machine embodies the high levels of quality and reliability that have become representative of the McPhee nameplate.

Before operating the mixer unit it is recommended that you take time to familiarise yourself with this manual which provides important guidelines on additional safety practices, operating procedures, Maintenance operations and information relating to support services and the ordering of parts.

△ **CAUTION:** All safety instructions presented in this manual are intended merely as guidelines to operating the Mixer Unit, and should therefore always be used in conjunction with any other safety measures that may be required to provide a safe working environment.

1.1. Mixer Terminology

The following terms and part names are used for the purposes of this manual and in the servicing or ordering of parts:

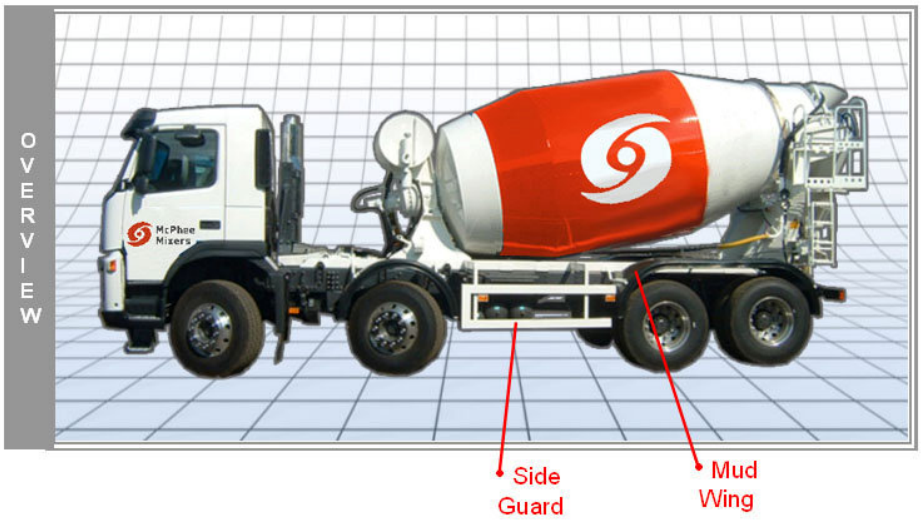
Near Side – The passenger's side of the vehicle, near the kerb, the side featuring the ladder, platform, water meter. Often shorten to N/S.

Off Side – The Driver's Side of the vehicle, the side featuring the 3rd Chute, Identification Badge, etc. Often Shorten to O/S.

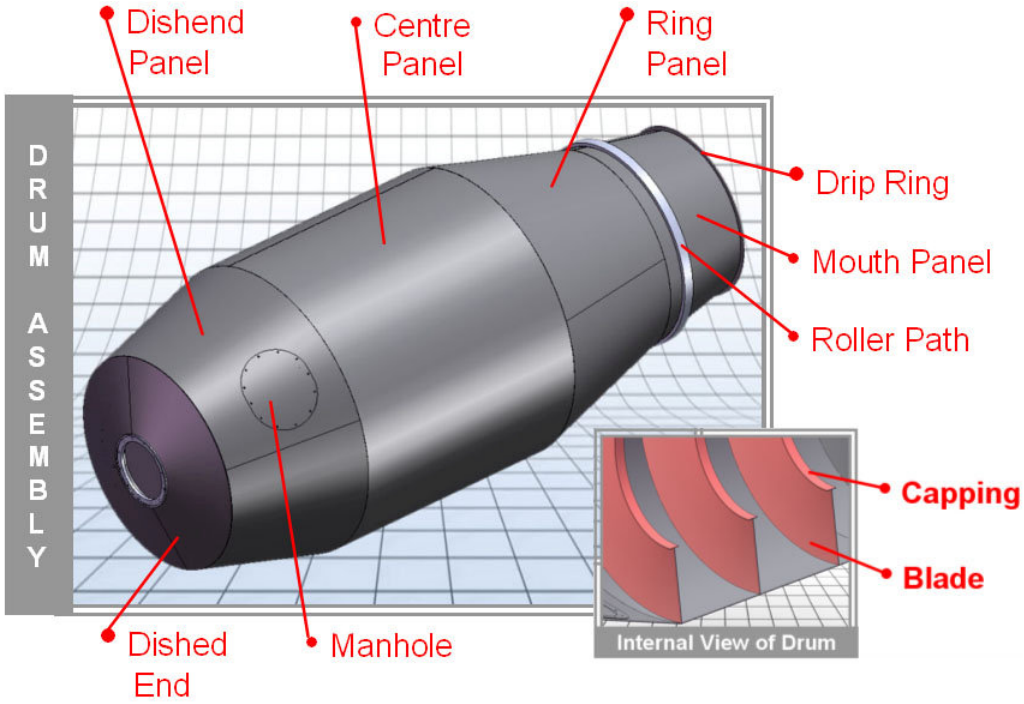
1.2. Part Identification

The diagrams below, and on the following pages, outline each of the main components of the Mixer Unit and individual part names. Referring to these part names will increase the speed at which enquires can be dealt with and will help to avoid misunderstandings.

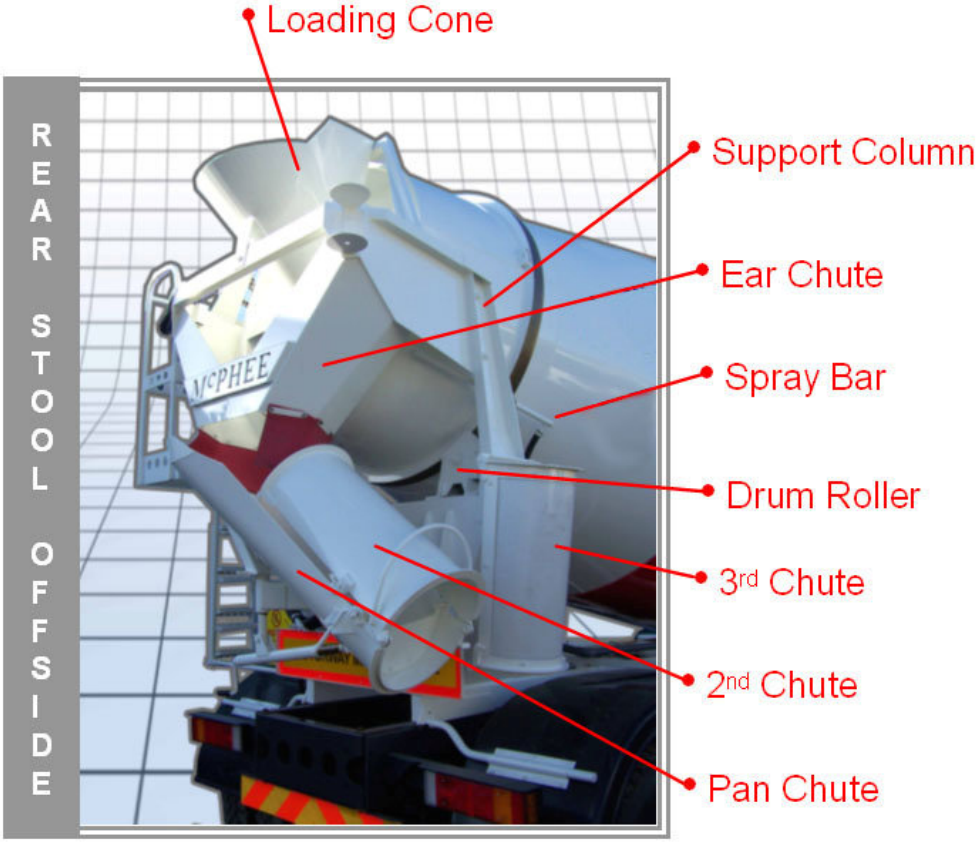
Overview:



Drum Assembly:

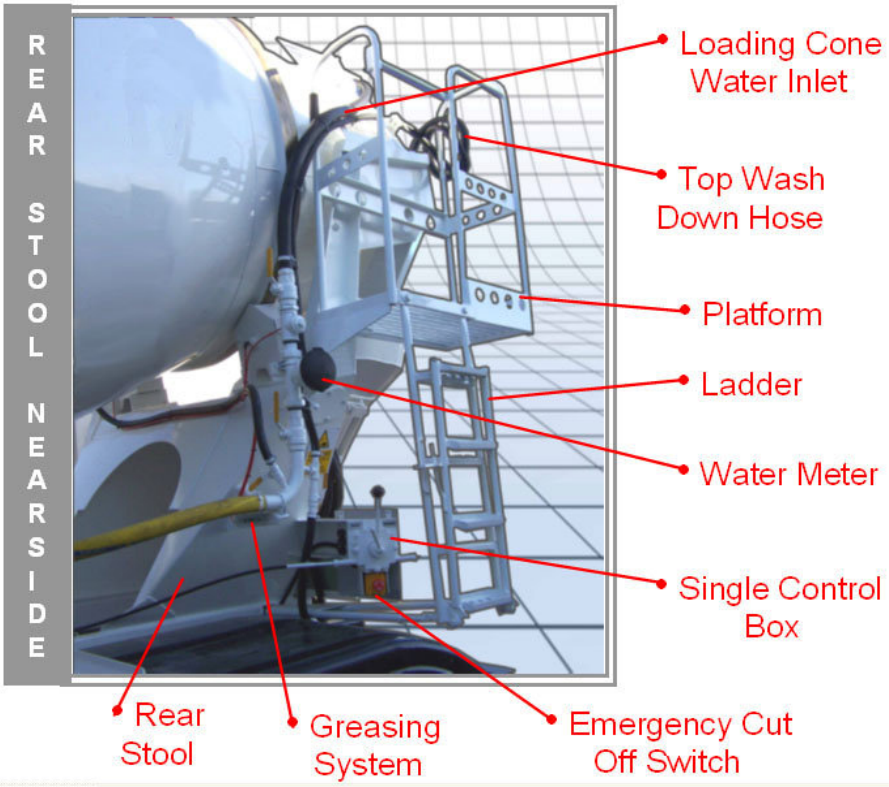


Rear Stool Assembly – Off-Side Perspective:

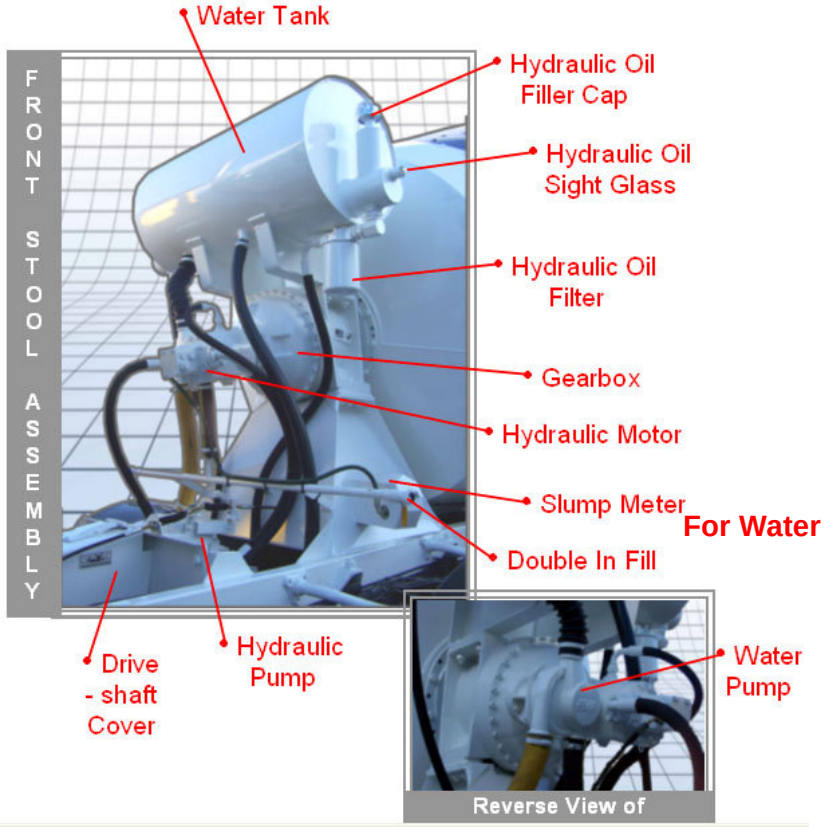


Rear Stool Assembly – Rear Perspective:

Rear Stool Assembly – Near-Side Perspective:



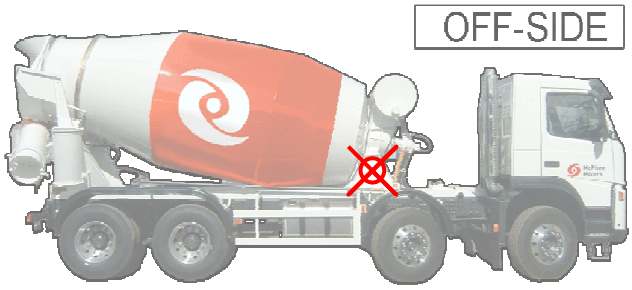
Front Stool Assembly:



1.3. Unit Reference Number - Identification Badge

Location:

Front Stool, below the gearbox on the Offside (driver's side).



Purpose:

This badge informs all parties of the McPhee Mixer Identification number (Unit Reference Number) which is unique to each unit. This number enables McPhee Mixers to keep an accurate record of your mixer.

CAUTION: To aid McPhee Mixers in supporting this concrete mixer it is essential they match the owner of the vehicle with this unique identification number. Please have this number available when communicating with McPhee Mixers.

2.

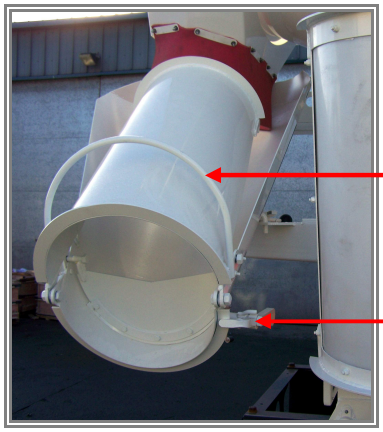
Safety Guidelines

At all times safety must be an operator's primary concern when using the Mixer Unit. In addition to the points highlighted below an operator must also take any and all other safety measures that may be required to provide a safe working environment. Furthermore, if operators are uncertain about any element of the mixers operation or a maintenance procedure then official advice should be sought before proceeding.

General Safety Guidelines:

- Before use, make certain that no one is inside the drum or in close vicinity to the Mixer Unit.
- Check that nothing is obstructing or resting against the drum and that it is clear to revolve, see also '*Starting Off*', *p.12.*
- Ensure that your vehicle is in good working order and is fit for purpose.
- Ensure that as an operator you are in an alert and healthy state and in possession of all operating licenses required to transport and make use of the Mixer Unit.
- Never allow untrained or unauthorised persons to operate or work in close proximity to any part of the mixer unit.
- Always keep a safe distance from any moving parts and avoid wearing any pieces of loose clothing.
- Always know the properties of the materials that you are using and ensure that you have the appropriate safety equipment for handling such materials.
- When conducting any maintenance or inspection operations make sure that the vehicle is completely powered down and that the cab is isolated with the keys kept in your own possession.

- When using the ladder and platform always ensure:
    - The ladders are fully deployed.
    - The ladders are secure and are not iced over or slippy in any way.
    - That your movements are confined to the platform area and that the safety spring lock is closed behind you (see diagram below).
    - That you never climb onto the support beams surrounding the platform or onto any further parts of the Mixer unit, such as the Loading Cone or Ear Chute.
    - When using the ladder and platform use slow controlled movements.
    - Do not carry items up or down the ladder. Always maintain three points of contact.
- When using the chutes always use the chute handle and the 'anti-finger trap' (see diagram). Keep hands well away from all chute mouths.



- In addition to these points please consult all of the other safety guidelines and warnings that are presented throughout the rest of this document before using the Mixer Unit.

3.

Operating Instructions

3.1. Starting Off

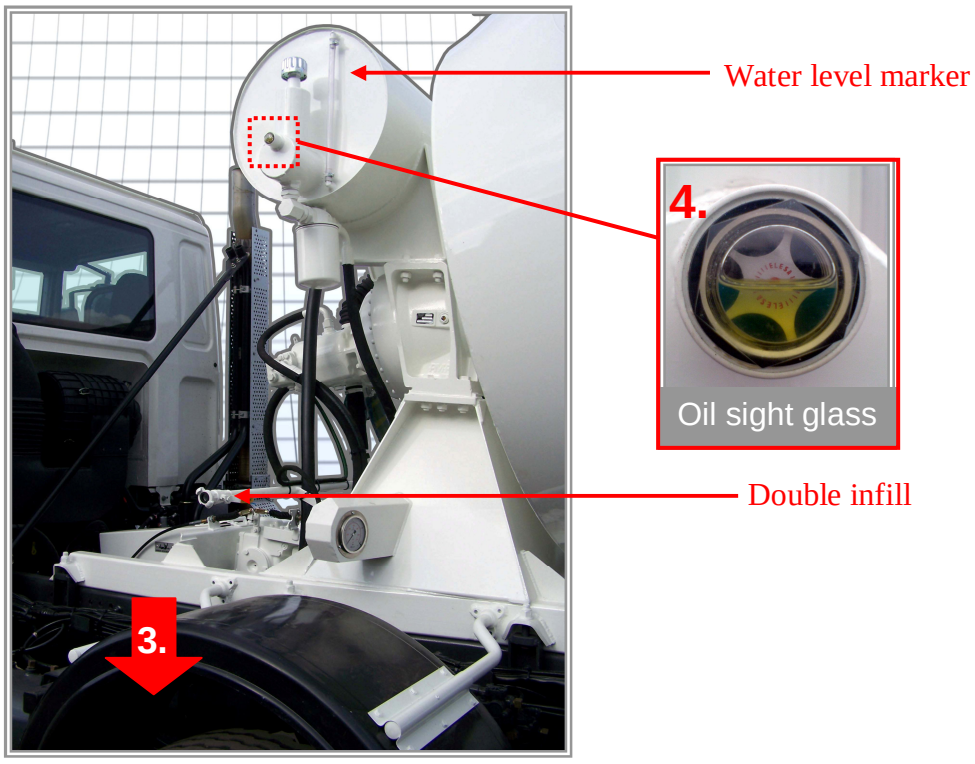
1. Fill the water tank by connecting a hose to either side of the double infill**.**

2. Check that the water tank is filling by observing the water level marker.

3. Be aware that when the water tank is full water will run from the overflow pipe situated just forward of the front stool.

4. Check the oil sight glass. On level ground your oil sight glass should ideally be ½ to ¾ full.

WARNING: When your mixer is working the hydraulic oil gets hot and will expand. Do not fill past the upper sight glass level.



Also check that:

- All hoses are present, with secure connections, and that all ball valves are closed.
- Grease has been applied to all necessary parts as outlined in section *4. Maintenance, see p.26 onwards.*
- The Drum Lock is not attached to the drum and that the drum is free to revolve, see *pages 32-33* for guidance.
- Before transit check that the ladder, and all chutes have been securely locked in place.

WARNING: For vehicles with a constant drive PTO:

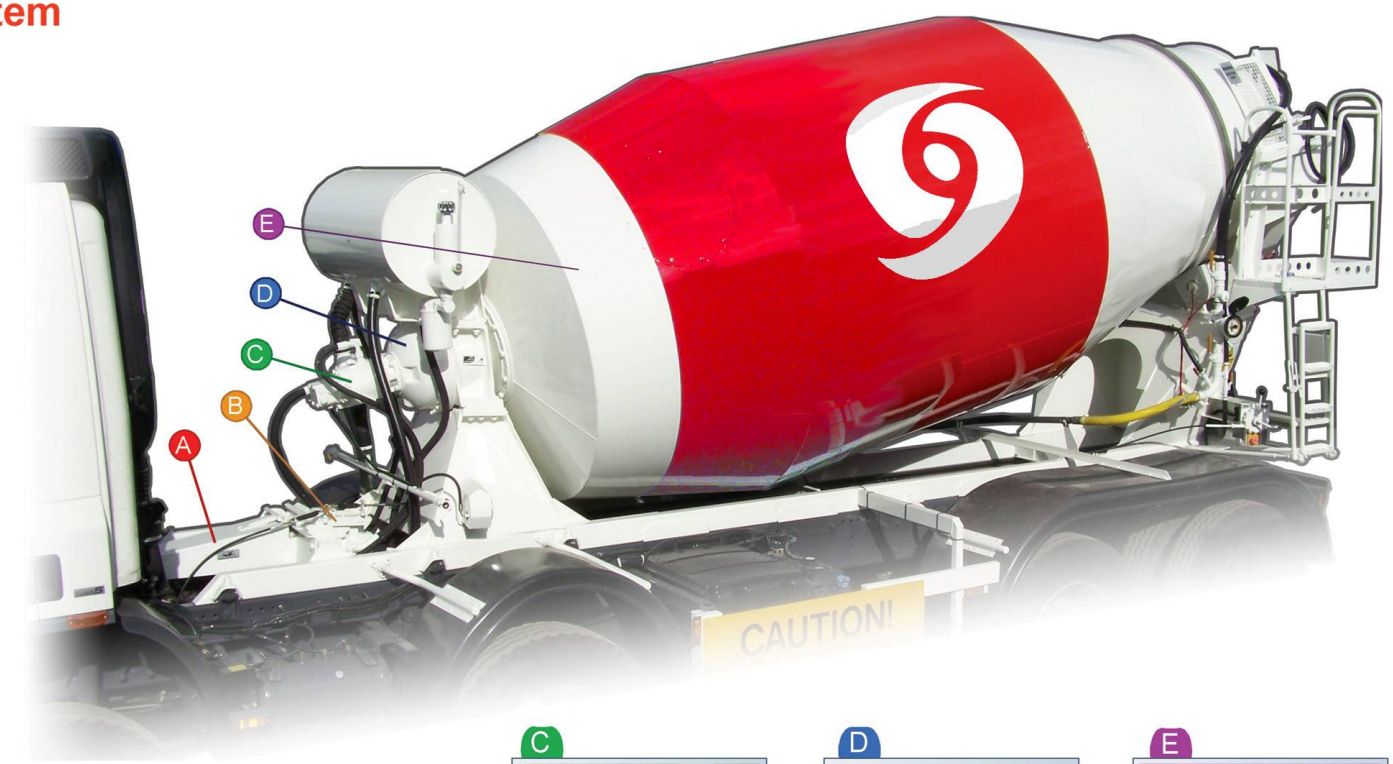
The mixer hydraulic pump continually sends hydraulic fluid around the mixer system, even when the drum is not turning, this movement creates heat. The water held in the water tank acts as a cooler for the hydraulic oil.

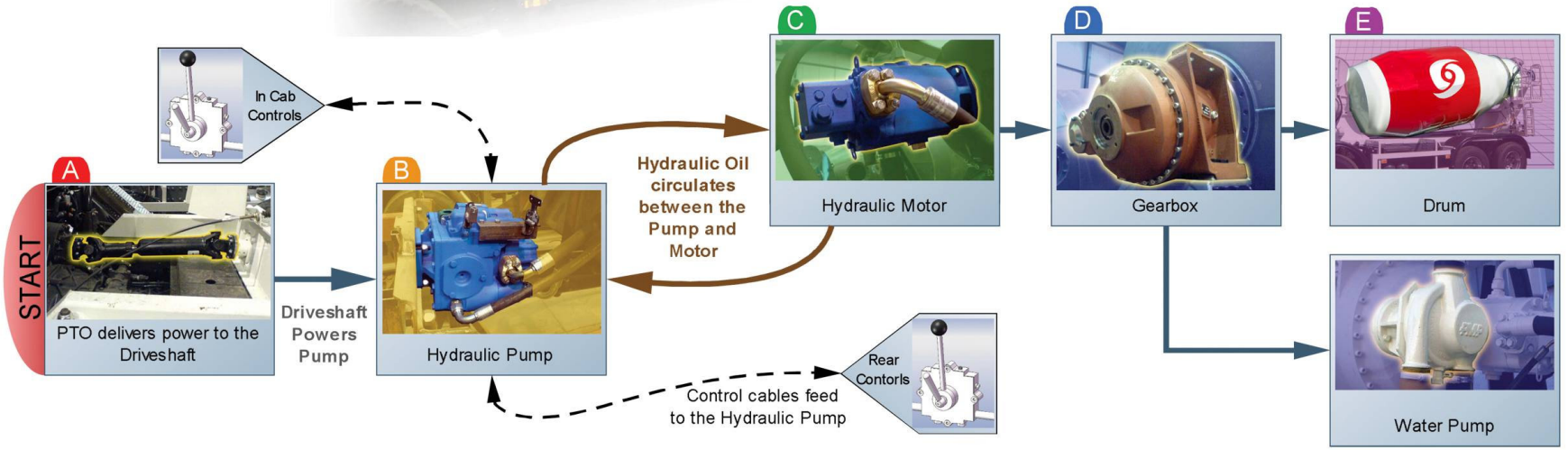
It is important to keep water in the water tank during working hours, especially on long journeys (50+ miles) and during the summer months.

3.2 Drum Power System

Power is provided to the Drum by means of a PTO (Power Take Off) system that originates from the Chassis Engine.

The system provides two control points; the '*In Cab Controls*' and the '*Rear Controls*', to determine both drum speed and direction. An Operator may use either of these control points to charge or discharge the drum.





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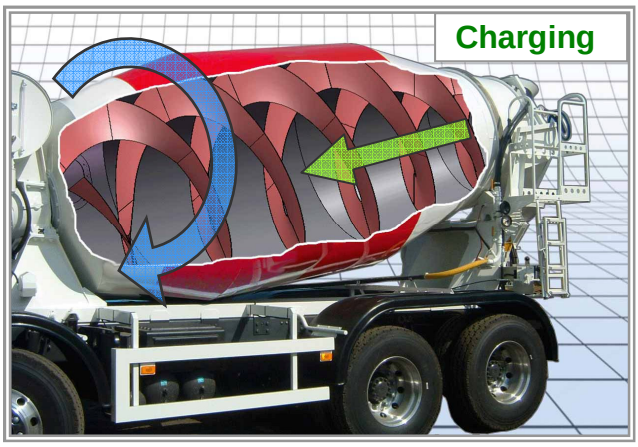
3.3. Charging

Charging involves rotating the drum and the internal spiral structure so as to push the load towards the dished end of the drum. This action has the following effects:

- It assists in loading the Drum.
- It allows different parts of a mixed load to blend.
- It maintains the load in a 'wet' state, i.e. prevents concrete from setting by keeping it in motion.

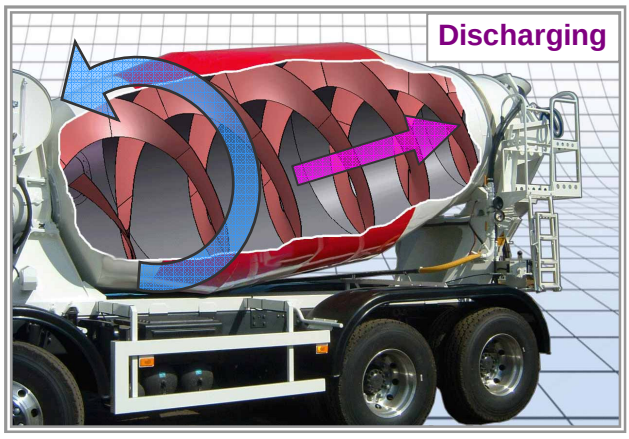
Charging is achieved by use of either the In Cab Controls or the Rear Controls, *see pages 16-17.*



3.4. Discharging

Discharging is the reverse process to charging and therefore involves rotating the drum in the opposite direction. When discharging the load is pushed out of the drum and is delivered to the chutes at the rear of the mixer.

Discharging is achieved by use of either the In Cab Controls or the Rear Controls, *see pages 16-17.*



3.5. Using the In Cab Controls

How the Controls Function:
The handle on the controls is connected to the hydraulic pump by means of a cable. When the handle is deflected in either direction the tension in the cable causes a control lever at the hydraulic pump to shift.

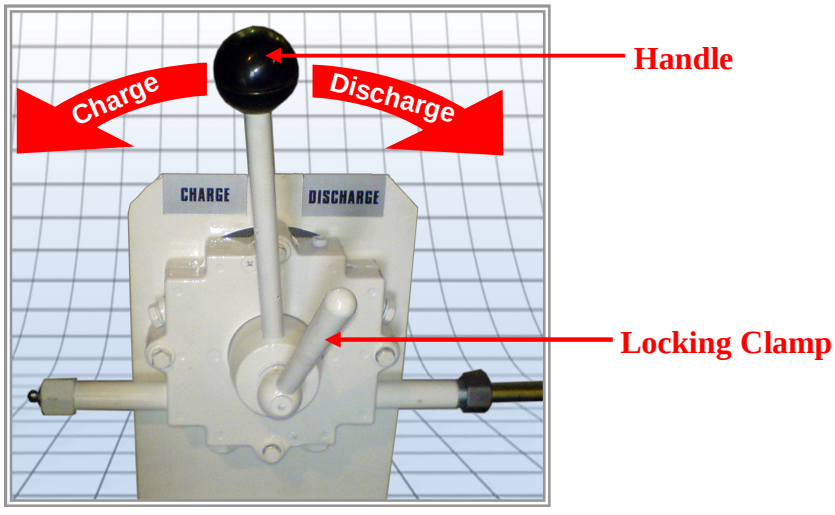
Drum Direction:
It is the shifting of the control lever at the hydraulic pump that determines drum direction. Hence a charging or discharging motion is achieved by operating the handle in either of the directions indicated.

Drum Speed*:*
As the handle is deflected away from the neutral position, and towards either of the directions indicated, the drum will begin to rotate. The drum speed will increase as the deflection of the handle increases.

Drum speed, i.e. revolutions per minute, can then be further increased by increasing the engine revs.

Drum Power:
It will be a combination of engine rev and hydraulic pump deflection which will generate the torque required to turn the drum, especially when carrying dryer mixes (low slump).

Locking Clamp:
Rotates to lock the main lever in place. Used to either ensure / maintain the drum direction or to avoid looseness and excessive shaking during transit.



WARNING: Never move the control lever from charge to discharge in one movement. Bring the drum to a stop position before changing direction.

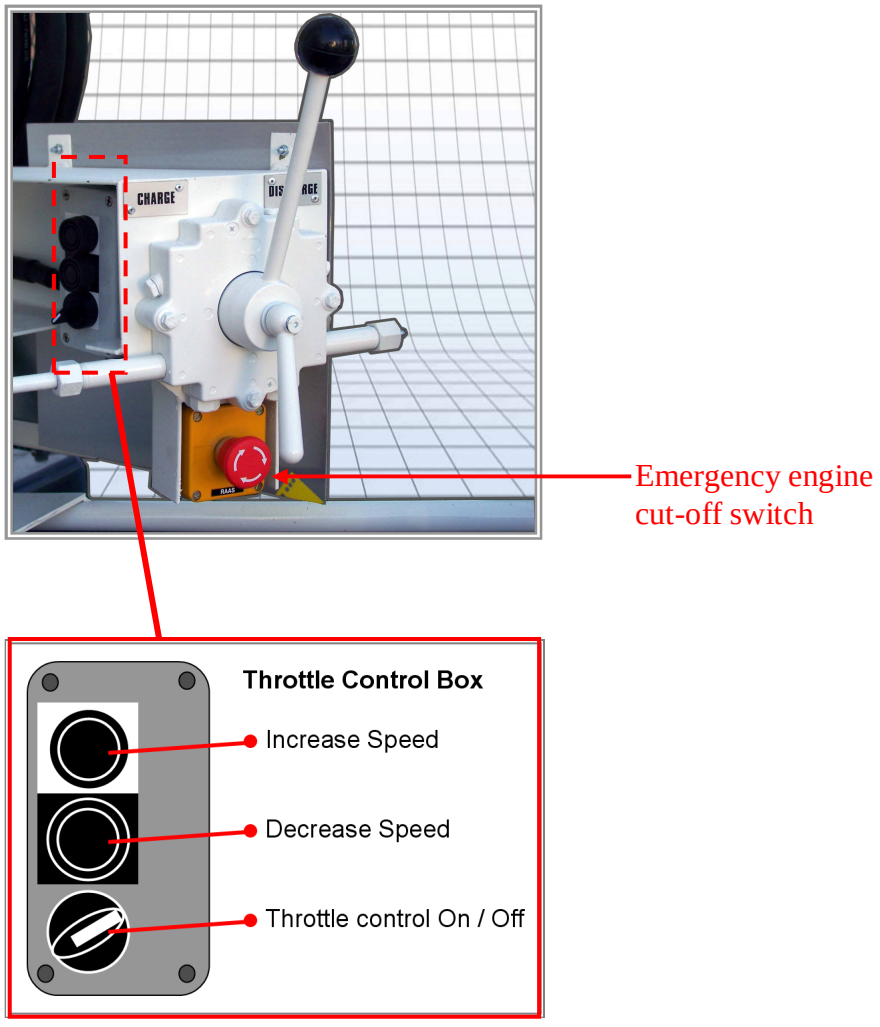
In addition drum speed should not exceed **14 RPM**.

3.6. Using the Rear Controls

How the Controls Function:
The Rear controls function in exactly the same manner as the In Cab controls described on *p.16* . However, in addition to the normal throttle pedal, engine revs can also be adjusted by use of the throttle control box as indicated below.

Another feature of the rear controls is the inclusion of an emergency engine cut-off switch, see description below:

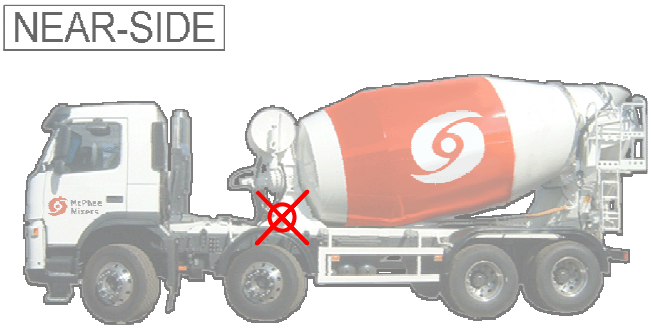
Emergency Stop / Engine Cut-Off:
Push to cut power from the engine. Twist depressed button clockwise to release.

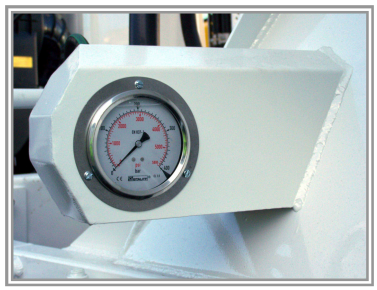


3.7. Slump Meter

Location:

Front Stool, below the gearbox on the Near-side (passenger's side).





Purpose:

Used to gauge the slump of the load (i.e. the thickness or looseness of the concrete) the Slump Meter provides a measurement of the oil pressure within the hydraulic oil system (see drum power system diagram on *p.14*).

This measurement is therefore merely an indicator of the workload currently being placed on the drum power system. In this sense slump can be estimated by assuming the following:

A low water content mix of Concrete with low slump → **Causes** → **The drum power system to work harder** → **Causes** → **The hydraulic oil pressure to increase**

Hence, a higher reading of oil pressure will signal a lower slump.

While a lower reading of oil pressure will signal a higher slump.

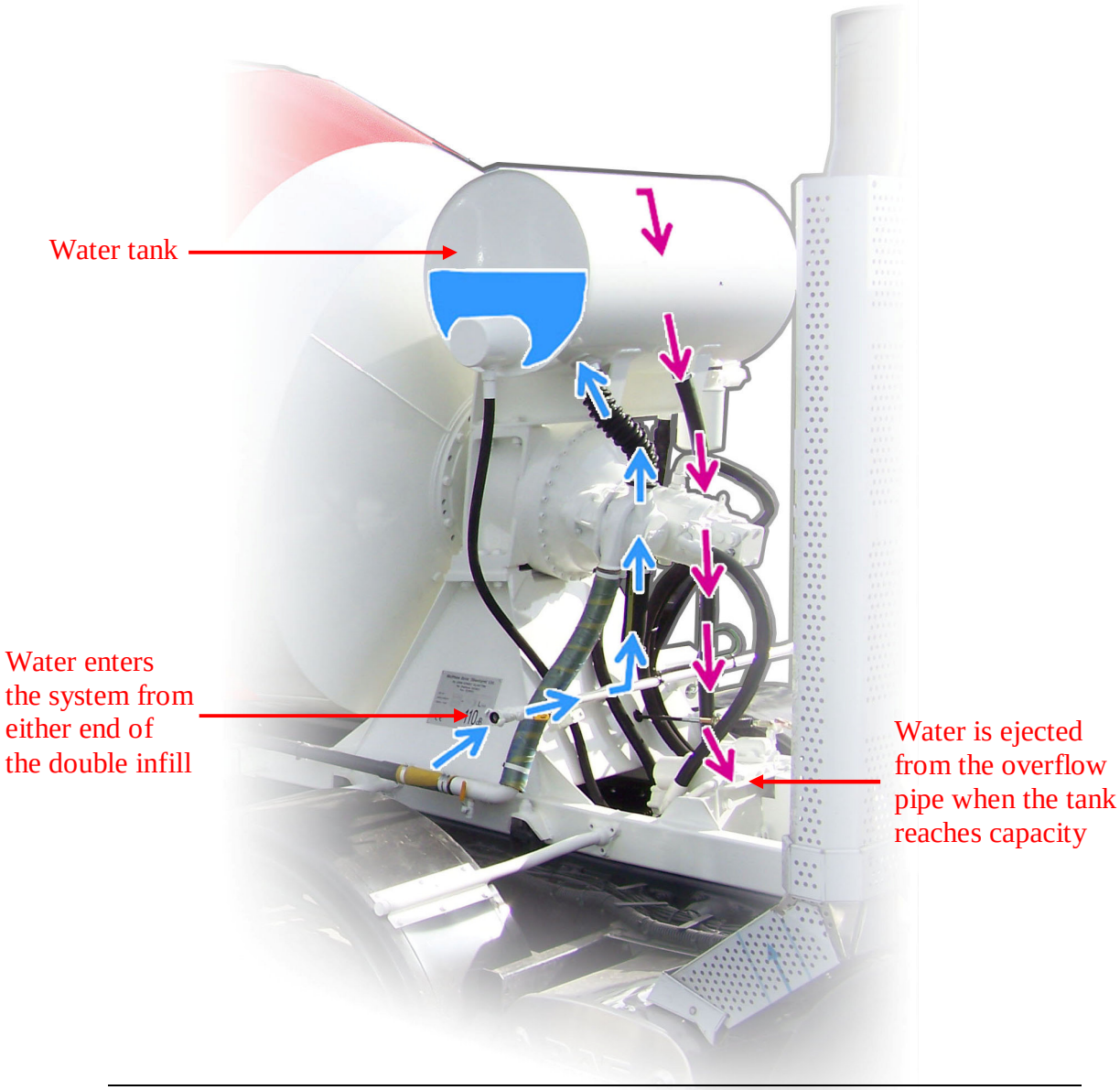
Note: The oil pressure reading will also vary due to factors such as drum speed, load size and working conditions. It is therefore not possible to give estimations on specific oil pressures and the resulting levels of slump. Such estimations are best formed by individual drivers through a process of trial and error.

3.8. Water System

Operated by the same drive system that provides power to the drum, the water system is active only when the drum is rotating (with higher H_20 pressure resulting from higher drum speed, i.e. the faster you rotate the drum the higher the water pressure will be). The water system provides all tools necessary for adding water to the load and for washing down the mixer after use.

Water system - Loading:

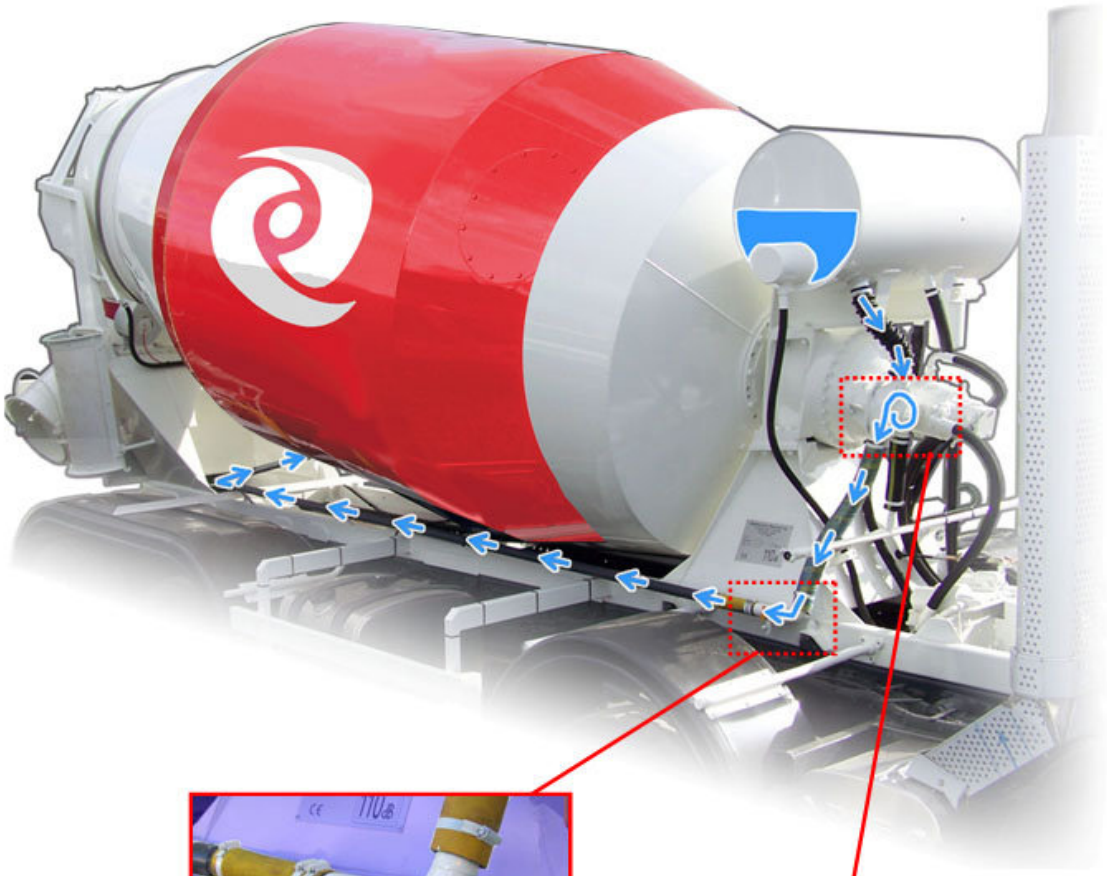
While the drum is at rest water can be added to the system by attaching a hose to either end of the double infill. When full the water tank will eject water via the overflow pipe, at this point water will flow from just forward of the front stool.


Water tank
Water enters the system from either end of the double infill
Water is ejected from the overflow pipe when the tank reaches capacity

WARNING: Only clean water is to be added to the water system. Loading the mixer with water that is contaminated or water that may contain foreign bodies, e.g. recycled water, is likely to result in chronic part failure.

Water System - When Drum is in Motion:

Water in the tank is placed under pressure by the water pump and driven towards the rear of the mixer along the Off-side.



Drain Elbow

Water Pump

Water System – Rear Water System Assembly:

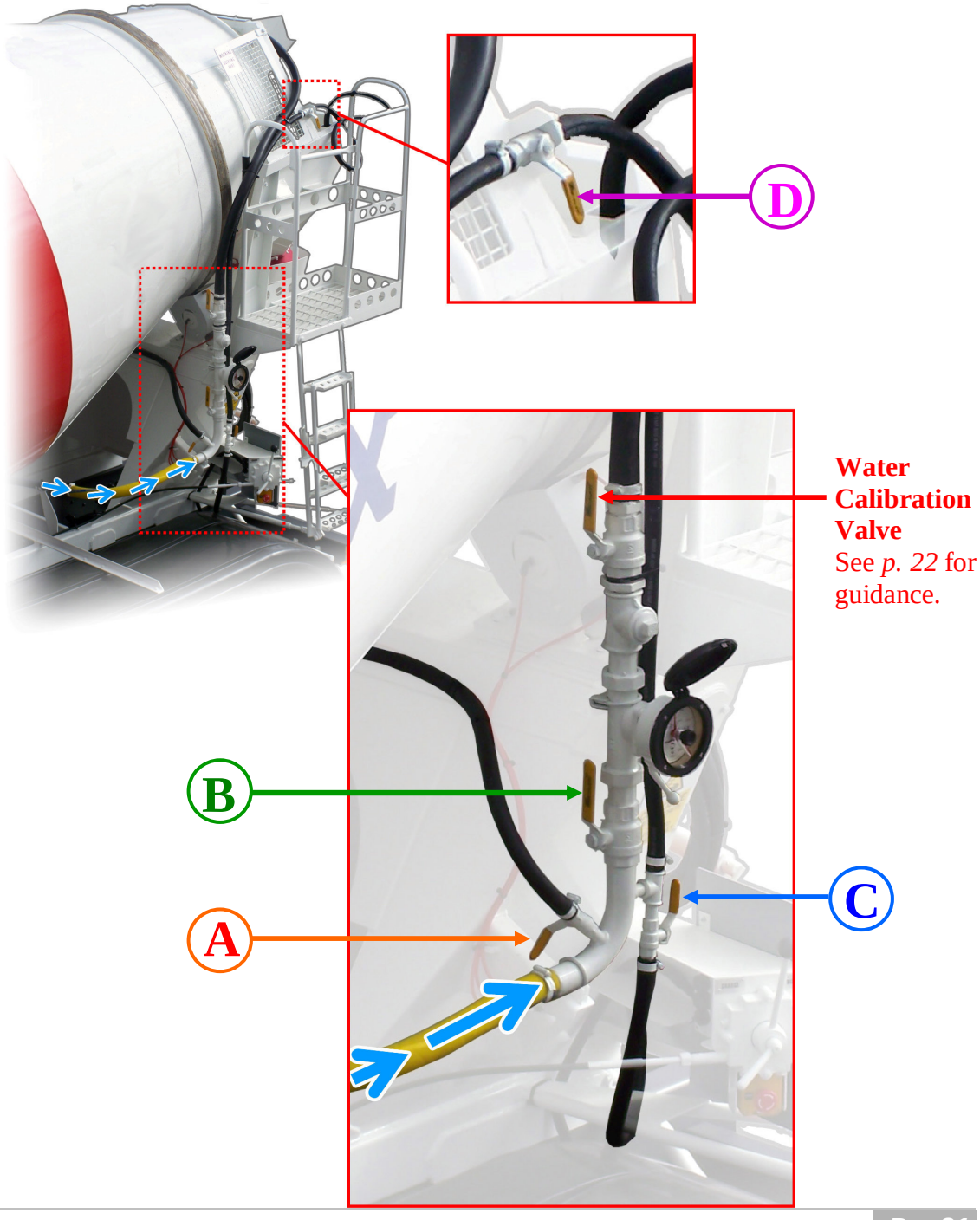
At the rear of the mixer the water system is split between 4 channels that are controlled by the following valves:

A. Activate / Cut flow to the **Spray Bar.** Used to wash down the mouth of the drum.

B. Activate / Cut flow to the **Drum Inlet.** Allows water to be added to the load.

C. Activate / Cut flow to the **Rear Wash Down Hose.**

D. Activate / Cut flow to the **Top Wash Down Hose.**



3.9. Water Meter

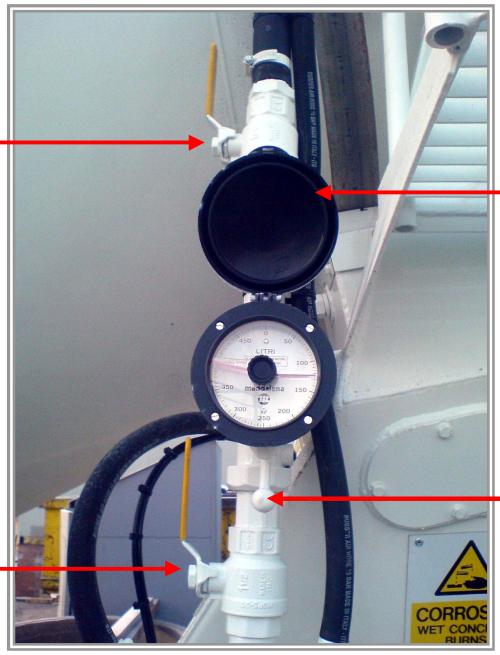
Location:
Near Side and to the Left of the Ladder assembly.

Purpose:
Measures the amount of water passing through to the drum.

Operating Instructions:

1. Lift Cover to reveal display.
2. Use Reset Switch to return reading dial to zero.
3. Open the 'Drum Inlet Valve' to allow water to flow into the drum.
4. Water meter reading will increase as water passes through.
5. Shut the 'Drum Inlet Valve'.
6. Water meter provides a measurement for the number of Litres that have passed from the water tank into the drum.

Water Calibration Valve
Should Always be open, for technician's use only. Utilised when technician is checking flow in meter.



Cover

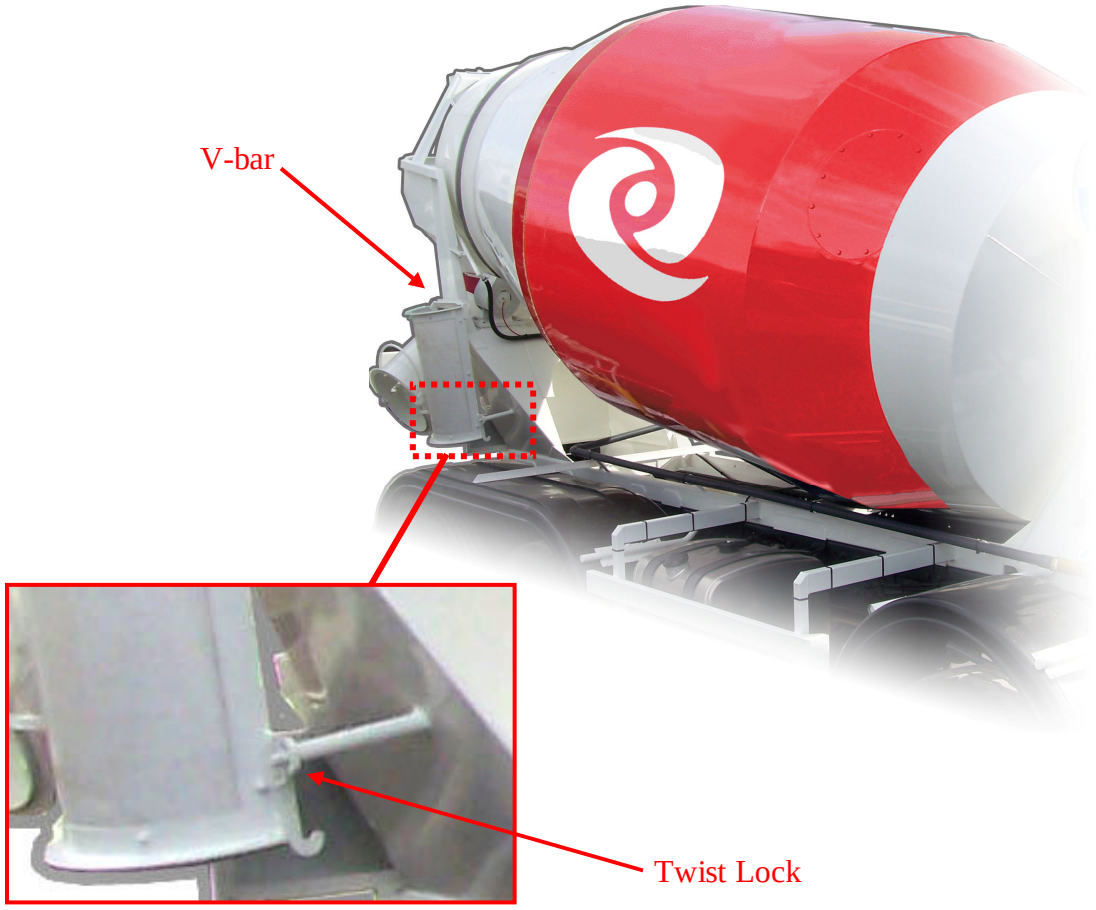
Reset Switch

Drum Inlet Valve
Open to allow water into the drum.

3.10. Finishing Off - After Discharging

- Use the rear and top wash down hoses along with the spray bar to clean the Drum, Ear Chute and Pan Chute of any remaining materials.
- Retract the Chutes, ensuring that they are locked into place, and that the ladder has also been raised and locked.
- Return the hoses to a coiled and hung state.

ALSO:



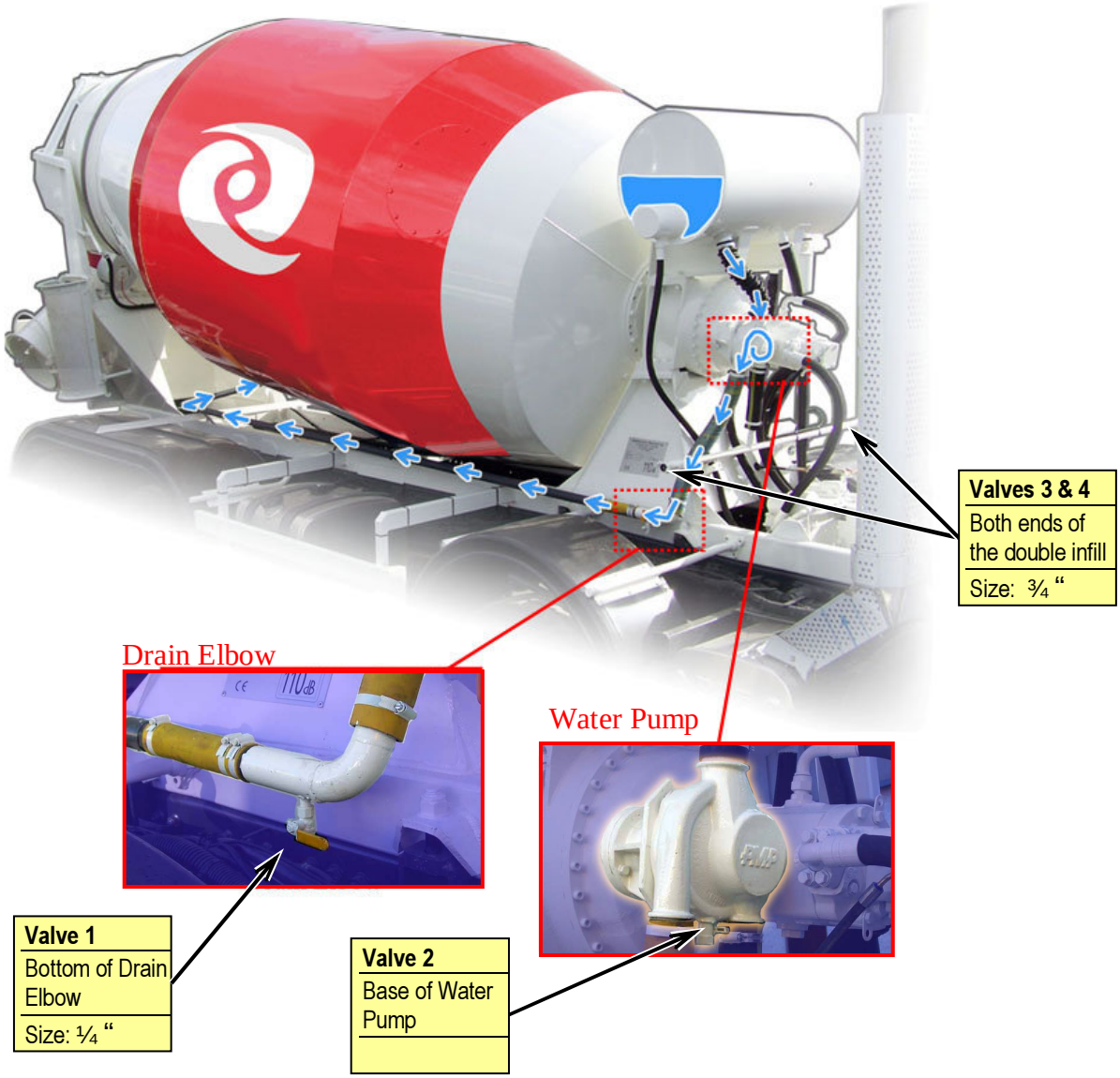
WARNING: Always ensure that the Third Chute has been securely tightened to the side of the Rear Stool assembly. In particular you must ensure that the Third Chute is **BOTH** slotted into the V-bar and locked in place with the protruding Twist Lock.

3.11.End of the Day - Draining the Water System

WINTER WARNING: To avoid frost damage to your Water Pump, Water Meter, Ball Valves and Water Hoses, you must drain all water from the system at the end of each day.

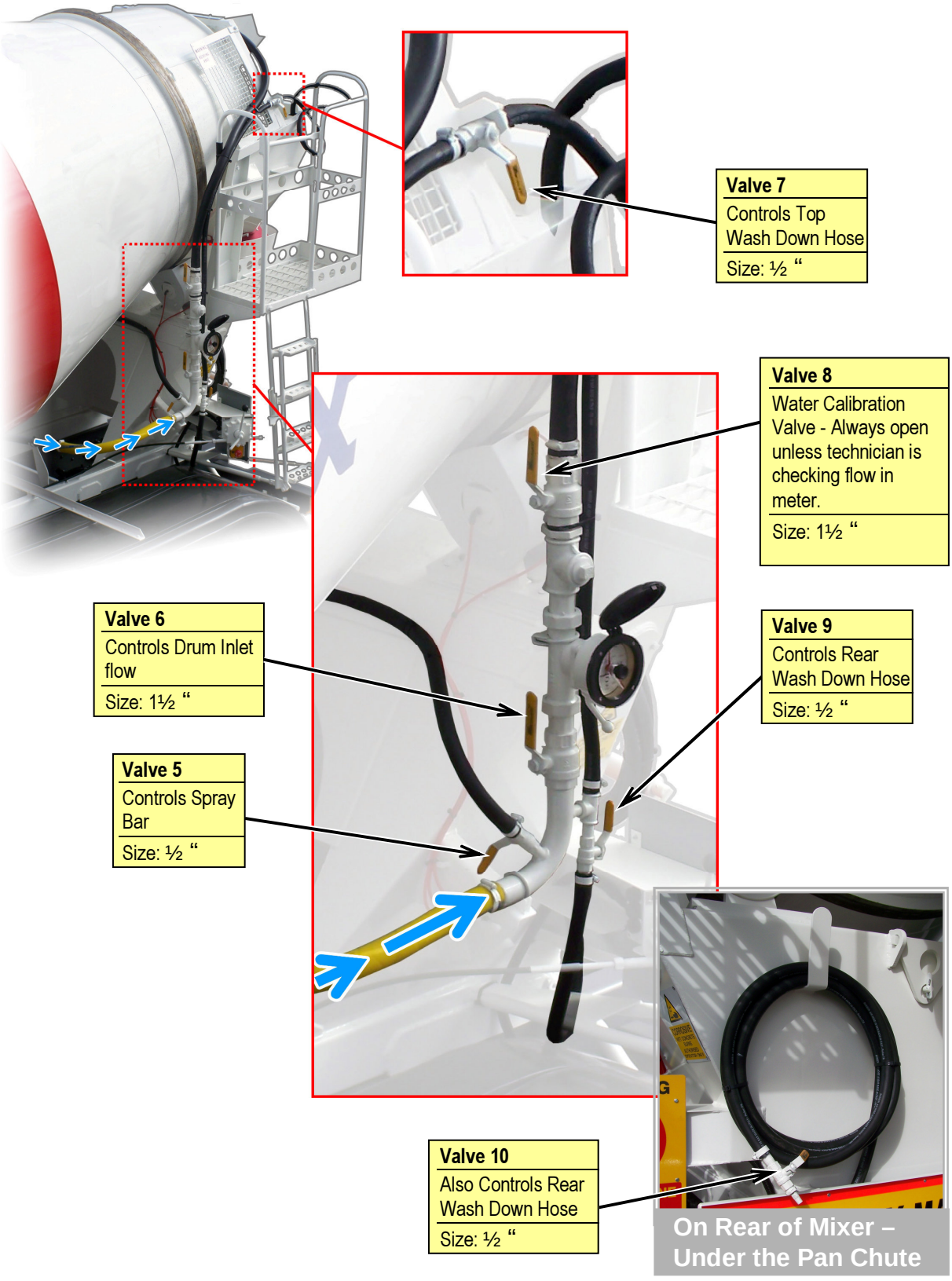
1. Park the vehicle on level ground to allow all water from the Water System to flow to the Drain Elbow.

2. Straighten out both wash down hoses and **open all ten of the ball valves marked in the diagrams below:**



CAUTION: Be aware of water ejecting from the valves as they are being opened, particularly when opening the valves on the hoses or the double infill.

Valves on the Rear Water System Assembly:



4.

Maintenance

4.1. 60 Month Warranty / Service Programme

As a new owner driver of a McPhee Mixer you have the option to be included in our 60 month warranty and service programme, within which we offer you a comprehensive service package, including:

- A repair or replace policy for any or all of the three items mentioned below.
  - Concrete Mixer Gearbox
  - Hydraulic Pump
  - Hydraulic Motor

- Servicing of the gearbox and hydraulic system approximately one month after the mixer has been in service and at nine monthly intervals thereafter.

- Servicing of the mixer on site.

- A general appraisal and safety inspection of the concrete mixer.

If you wish to receive further information on servicing and avail yourself to the extended Warranty / Service contract, please contact McPhee Mixers on **01698 823 422**. Alternatively you can complete the tear off slip on the next page and return it to the stated address.

To receive further information on the 60 Month Warranty / Service Programme please complete this form and return it to:

McPhee Mixers,
58 John Street,
Blantyre,
Glasgow,
G72 0JF

Tel: (01698) 823422
Fax: (01698) 823853

Details required:

Name: _____

Address: _____

Mobile Phone Number: _____

Unit Ref No: _____

Date on Road: _____

Vehicle Registration No: _____

Location/Plant: _____

4.2. Maintenance Equipment

To carry out maintenance operations you will need:

- Grease Gun.

- Needle Nose attachment for grease gun (required as some of the grease nipples (lube fittings) will be smaller and / or different in appearance to the chassis grease nipples).

- **High quality Lubricant must be used,** such as N.L.G.I. Grade 1 or 2 with E.P. additives and high temperature resistance.

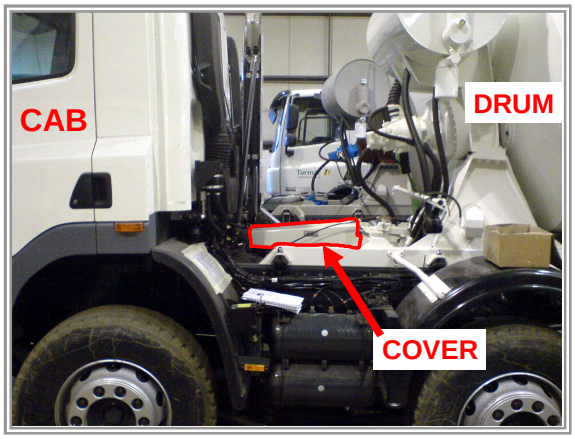
- Safety Gloves.

WARNING: Due to the position of the drive shaft you may be required to climb onto the area behind the cab. This climbing action can, by its nature, be hazardous. Every care should be taken not to slip or fall. Be aware of the conditions and use slow, controlled movements.

4.3. Driveshaft Maintenance Guide

Location:

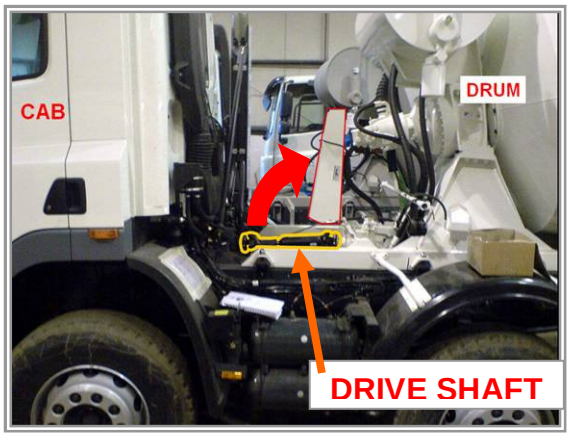
The Drive Shaft is located between the driver's cab and the drum assembly. Access is made by lifting the removable safety cover, as shown.

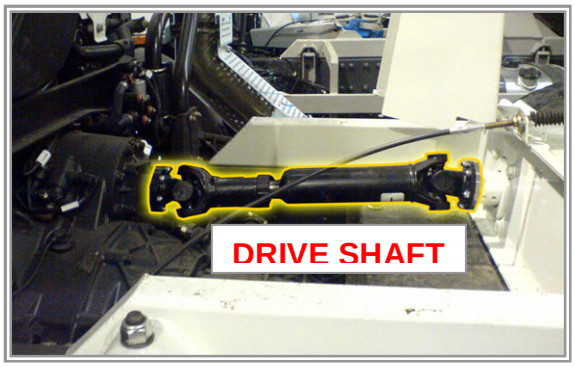


Function:

As part of the Power Take-Off (PTO) system the purpose of the Drive Shaft is to transfer power from the chassis engine to the mixer pump, which ultimately provides power to rotate the drum.

The operational status of the Drive Shaft is therefore vital to the functioning of the mixer unit and **it is essential that this part is monitored and maintained correctly**.

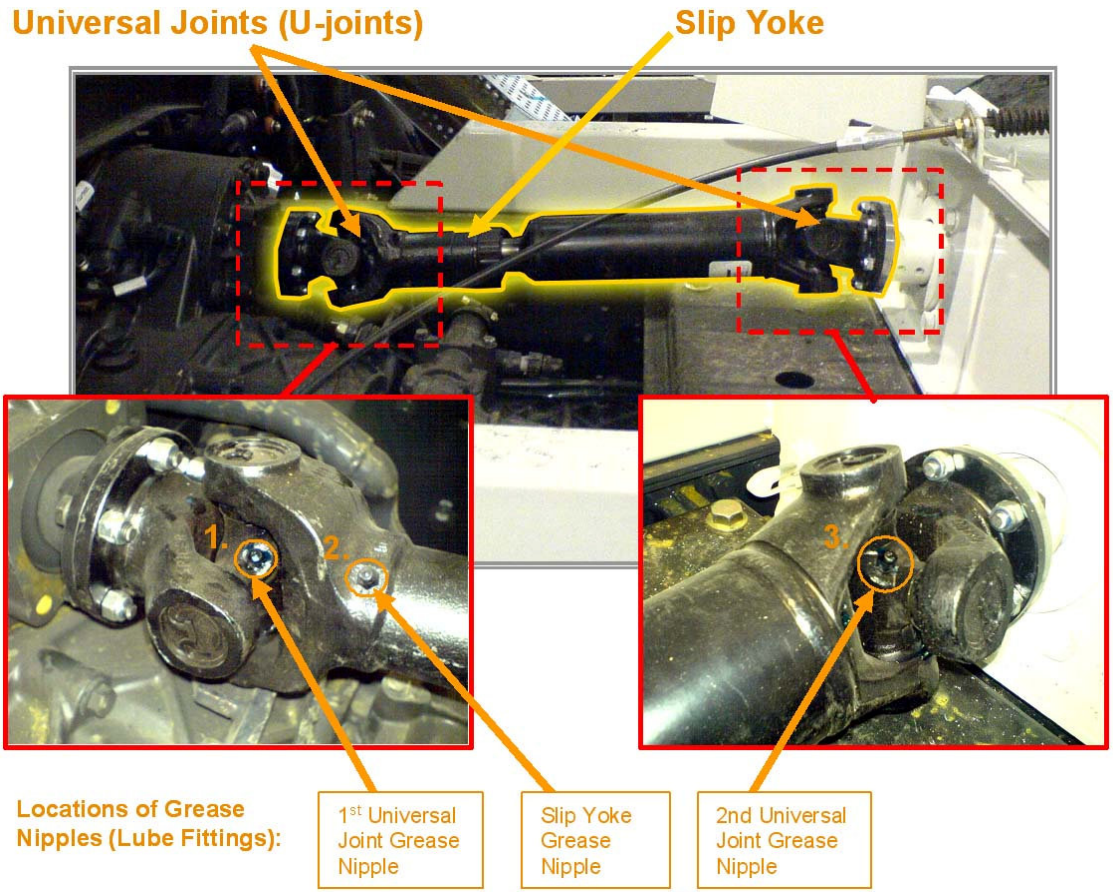




WARNING: Rotating shafts can be dangerous. you can snag clothes, skin, hair, hands, etc. This can cause serious injury or death.

Do not work on a shaft (with or without a guard) when the engine is running or without appropriate safety equipment.

Driveshaft Maintenance Instructions:

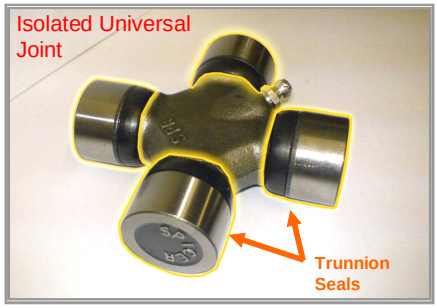


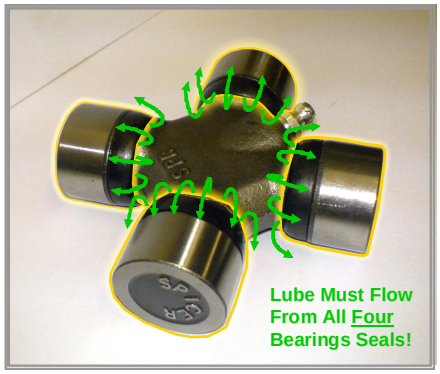
To maintain the Drive Shaft lubricant must be applied weekly. To do this you should:

- Locate the 3 grease nipples that are highlighted in the above diagram (taking care to spot any that are out-of-sight, dirt covered or difficult to reach).
- Apply lubricant, by means of a grease gun, to all of the grease nipples.
- Ensure that the Slip Yoke and all Universal Joints are lubricated thoroughly.

And

- **You must make certain that lubricant flows from all four bearings seals (Trunnion Seals) on all Universal Joints, as shown to the right.**





Avoiding Driveshaft Failures:

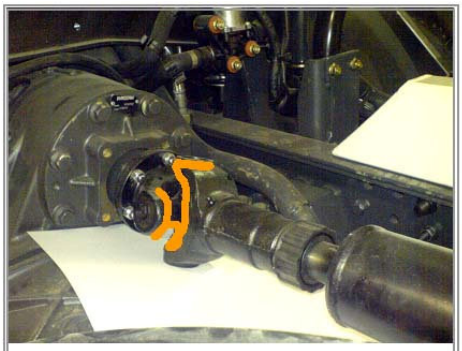
The most common cause of Drive Shaft failure is worn universal joints. It is therefore crucial that the following advice be applied to all Universal Joints:

- **Do** sufficiently lubricate each Universal Joint following the aforementioned guidelines above.

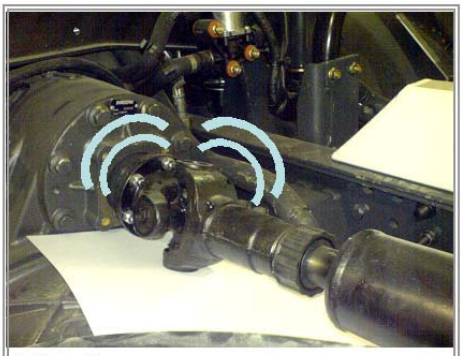
- **Don't** treat any Universal Joint with a lubricant that is not of sufficient quality (note that –lubricant quality must match or exceed that of N.L.G.I. Grade 1 or 2 with E.P. additives and high temperature resistance.)

Signs of Driveshaft Wear:

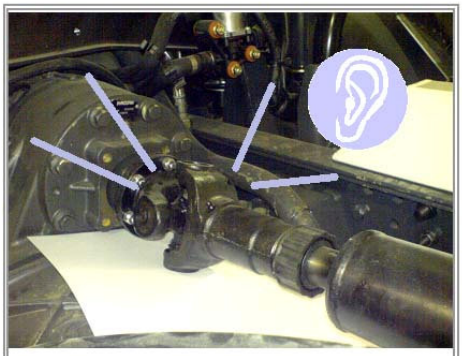
Drive Shaft problems are progressive in nature. Generally they accelerate rapidly to result in ruined components, it is therefore important to monitor the drive shaft for any unusual behaviour that may be an indicator of wear or malfunction, such as:



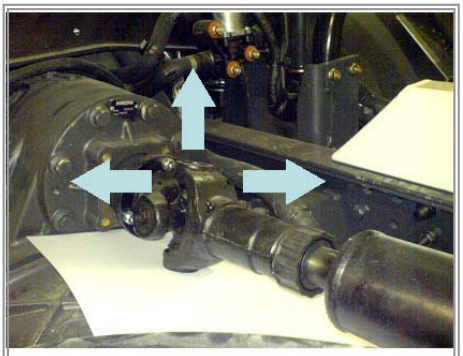
Universal Joint discoloration due to excessive heat build-up.



Vibration



An audible noise or squeal from the driveline.



Universal Joint Looseness

4.4. Entering the Drum

WARNING: Entering the drum can be a highly dangerous operation. It is therefore essential that all guidelines are followed and that any further measures, that may be required to create a safe working environment, are put in place before attempting to enter the drum.

Before entering your drum:

- Park on level ground, turn your engine off and apply your handbrake.
- Lock your cab and **keep the keys in your possession.**
- Make sure a third party knows where you are, what you are doing and how long you intend to be.

Whilst inside the drum be AWARE!

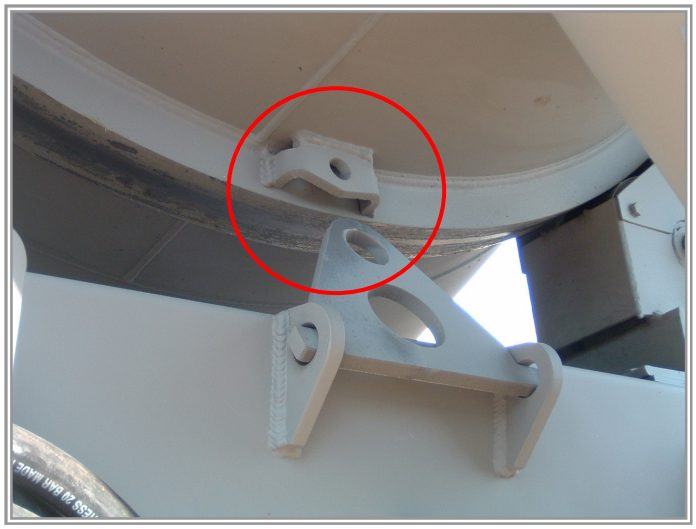
- Concrete can fall from above.
- Metal edges can be sharp.
- Protective clothing must be worn.
- Additional lighting may be required.

Engaging the Drum Lock:

Before entering the drum via the manhole you **MUST** engage the drum lock.

1. During normal operations the drum lock should be in the above position, i.e. held behind the anti-loose fastener.

2. Disengage the anti-loose fastener. Flip the lock into the position shown - remove shackle - rotate drum until lug on drum ring is adjacent to drum lock then **TURN OFF YOUR ENGINE !**



3. Locate the shackle as illustrated.

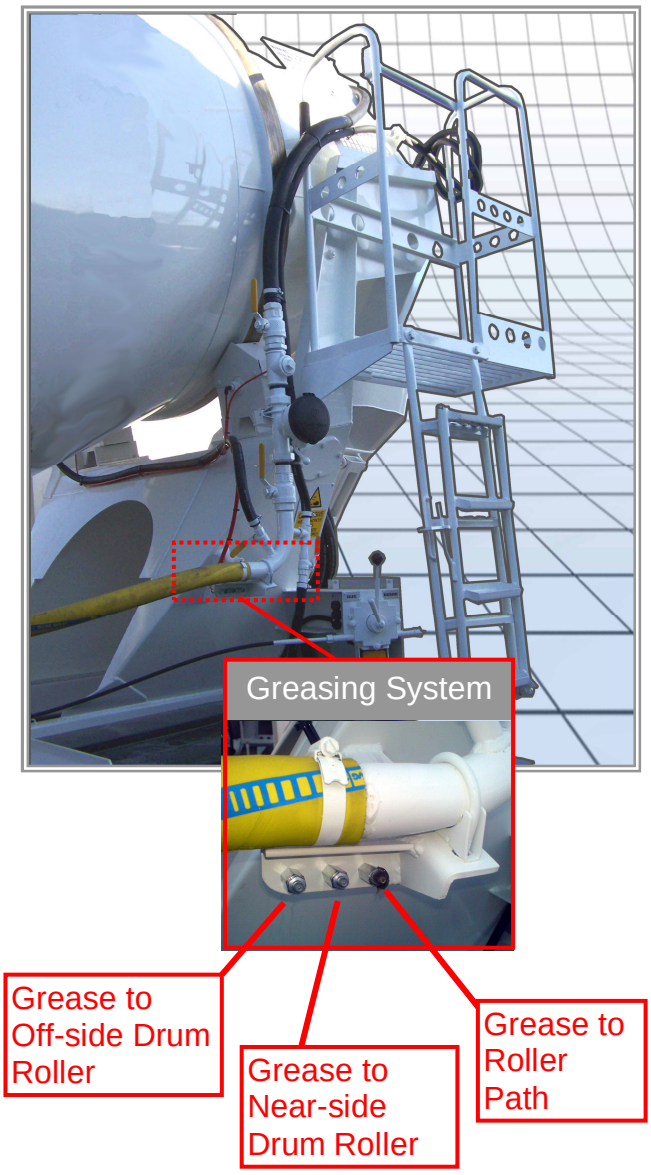
REMEMBER: after inspection you must remove the shackle and return the lock to the condition shown on *p.32* before starting the chassis engine.

BE AWARE: The drum lock is designed solely to prevent drum movement caused by the weight of a person working within the drum. It **WILL NOT** prevent the drum from rotating if the engine is engaged and the hydraulics activated.

4.5. Greasing of the Roller Path and Drum Rollers

Drum Rollers:
Should be lubricated around 2 or 3 times per week, whilst ensuring that the inside of the Roller cradles remain free from dirt and excess grease. See image below for grease application points.

Roller path:
Should be sufficiently lubricated so that it is covered with a thin layer of grease at all times. Lubricant should therefore be added whenever necessary to achieve this, so typically around 2 or 3 times per week. See image below for grease application points.



4.6. Further Greasing / Maintenance Requirements

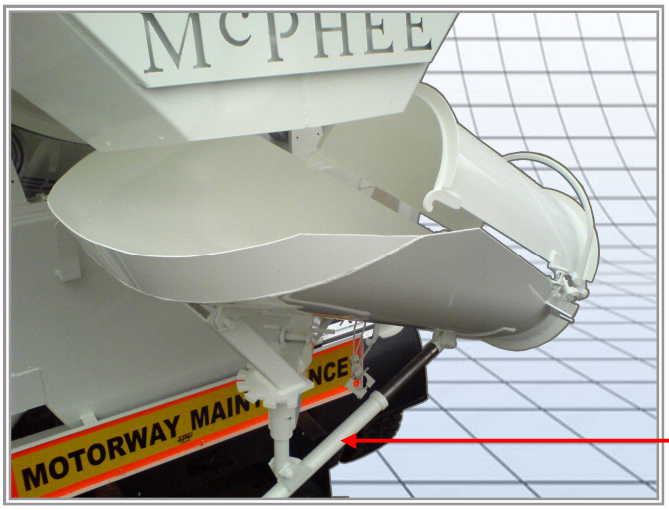
Greasing of the Screw Jack:

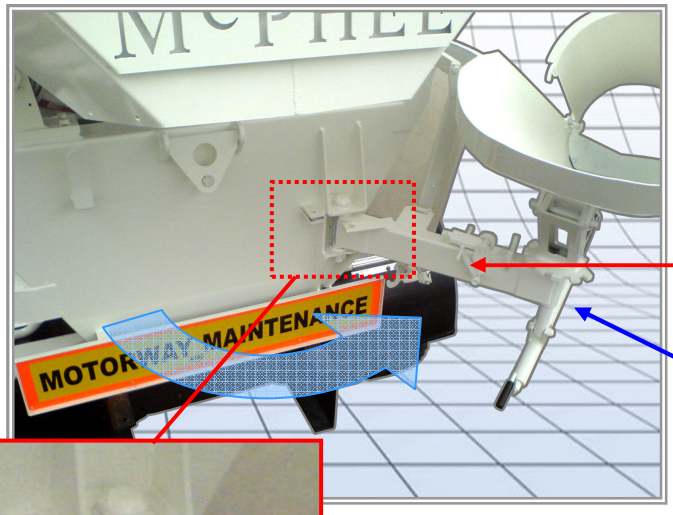
Should be lubricated weekly (nipple located near handle end).

Greasing of Support Arm A:

Greasing nipples are located on both ends of Support Arm A. lubricant should be applied to '**Nipple A**' weekly and to the other nipple whenever the joint is flexed.

Support Arm A is also hinged to the back stool. In order to facilitate discharging into high sided vessels it is possible to swing the entire chute assembly to one side, as shown in the diagram below. If this hinge is not greased and flexed periodically it may seize up.

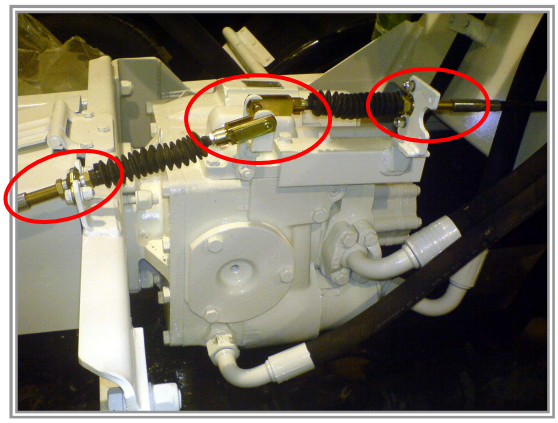




Greasing of Control Cables:

At the Hydraulic Pump:

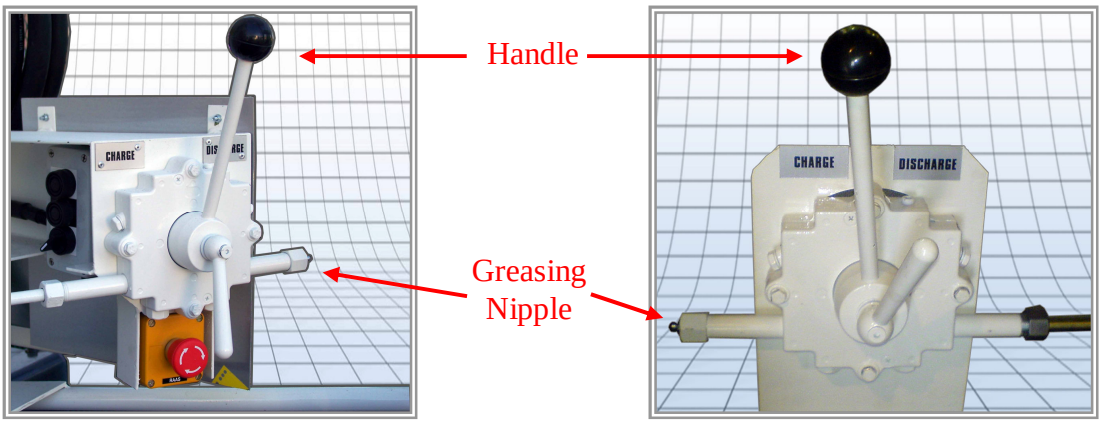
Grease should be applied to all of the exposed areas of the control cables as they approach the hydraulic pump. Grease as required so as to ensure that these areas are covered with a thin layer of grease at all times



At either Control Box:

Grease should occasionally be applied to the greasing nipples that protruded from the ends of the Control Boxes. Ideally these parts should only be greased as required (i.e. if there is stiffness when using the handle) and should not be greased more than 2 or 3 times per annum.

△ **CAUTION:** Over greasing of these parts will result in a negative effect whereby hydraulic locking will occur and the handle will actually become stiffer to use.



4.7. Summary of Oil Changes

Part requiring oil change	Location	Oil type	Amount required	Replacement Timing
Mixer Gearbox	NEAR-SIDE	Gear Oil EPB 80w/90	18 Litres	Change gearbox oil at 2 months then every 9 months thereafter, but no longer than 1 year*.
Hydraulic Pump and Motor	NEAR-SIDE	Hydraulic Oil (ISO 46)	25 Litres	Change the filter and fluid at 2 months then every 9 months thereafter, but no longer than 1 year*.

WARNING: During use the Hydraulic Oil and the Gearbox Oil get hot and will expand. Opening the Oil Filter or Gearbox Casing when the oil is in this state can cause a stream of extremely hot oil to eject from the housing at speed. Maintenance such as oil changes should therefore only be carried out once the oil has cooled.

* *Care for this maintenance operation is intended to match the timing schedule of the 60 Month Warranty / Service Programme, see p.26 for details.*

4.8. Summary of Maintenance Operations

Maintenance Operation	Location	Maintenance Timing	Notes
Greasing of the Roller Path	NEAR-SIDE	2 or 3 times per week	See *p.33*
Greasing of Drum Rollers	NEAR-SIDE	2 or 3 times per week	See *p.33*
Greasing of Control Cables	NEAR-SIDE	once per week	See *p.35*
Greasing of the Screw Jack	NEAR-SIDE	once per week	See *p.34*
Greasing of Support Arm A	NEAR-SIDE	once per week	See *p.34*
Driveshaft maintenance	NEAR-SIDE	Every 6 weeks – see also footnote on *p. 29*	See *pages 27 to 30*

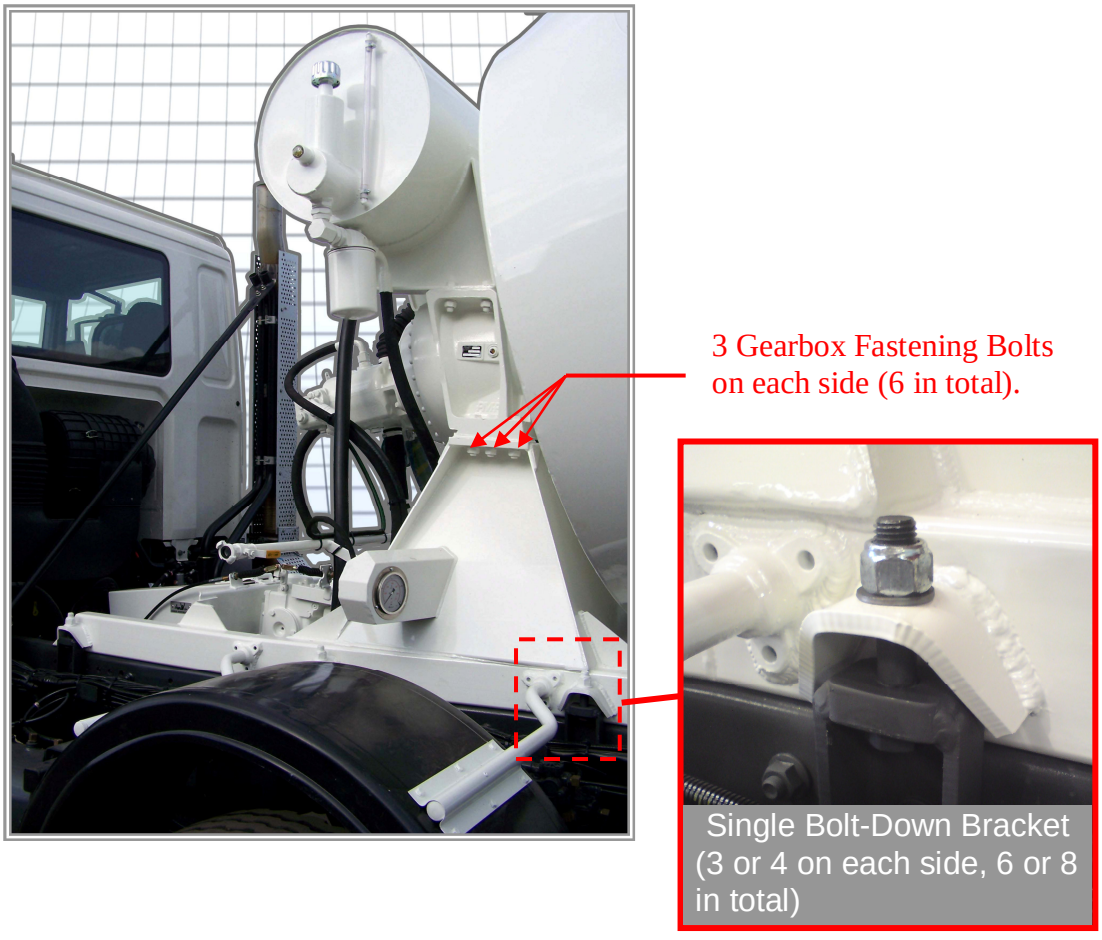
* *Care for this maintenance operation is intended to match the timing schedule of the 60 Month Warranty / Service Programme, see p.26 for details.*

4.9. Critical inspection area / important checks

At all times Operator's should be actively inspecting the mixer unit for any signs of wear or damage, such as loose connections, loose bolts, cracks and worn or faulty parts. Further to this, and in addition to the checks already outlined with this text, Operator's should make a particular effort to regularly inspect the Front Stool area of the mixer as follows:

After 1 week then quarterly thereafter you should*:

- Inspect all **Gearbox Fastening Bolts** and ensure that they are undamaged and have a secure and tight grip (tightening torque is set at approx 550 Nm).
- Inspect all **Bolt-Down Brackets** ensuring that they are also undamaged and have a secure and tight grip (tightening torque is set at approx 245 Nm).



WARNING: If any damage is observed in this part of the mixer or if any bolt is repeatably found to come loose this should be immediately reported to McPhee Mixers and replacement parts should be sought.

* *Care for this maintenance operation is intended to match the timing schedule of the 60 Month Warranty / Service Programme, see p.26 for details.*

5.

Troubleshooting

5.1. General Troubleshooting

For general Troubleshooting and enquiries please take a note of your Unit Reference Number (see *p.9*) and contact us on:

Tel: (01698) 823422
Fax: (01698) 823853

5.2. Breakdown

In the event of a breakdown, i.e. when a load is present in the drum but you are unable to get the drum to rotate, it is imperative that you **contact McPhee Mixers as quickly as possible:**

Telephone us on (01698) 823422 and be ready to state:

- Your Unit Reference Number (see *p.9*)
- Your current location